3GPP TSG RAN WG1 #100bis-e R1-200xxxx

e-Meeting, April 20th – 30th, 2020

Agenda Item: 7.2.4.2.1

Source: Moderator (Ericsson)

Title: Text proposal for TS 38.213 related to [100b-e-NR-5G\_V2X\_NRSL-Mode-1-03]

Document for: Endorsement

# 1 Introduction

This document contains a text proposal for supporting Type-1 codebooks for SL HARQ-ACK reporting to the gNB.

Following the existing agreements, the TP takes TS 38.213 v15.9.0 as the starting point. All changes described here are made on top of the procedures for DL HARQ-ACK reporting in that version of the specification.

# 2 Text Proposal

## 9.1 HARQ-ACK codebook determination

A UE does not expect to be indicated to transmit HARQ-ACK information for more than one SL configured grants in a same PUCCH.

In the following, the CRC for DCI format 3\_0 is scrambled with a SL-RNTI, or a SL-CS-RNTI.

### 9.1.2 Type-1 HARQ-ACK codebook determination

This subclause applies if the UE is configured with *pdsch-HARQ-ACK-Codebook = semi-static*.

A UE reports HARQ-ACK information for PSSCH transmission(s) with corresponding PSFCH reception(s) only in a HARQ-ACK codebook that the UE transmits in a slot indicated by a value of a PSFCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format 3\_0 scheduling the PSSCH transmission(s) or by a value of *sl-PSFCH-ToPUCCH* for a SL configured grant type-1. The UE reports NACK value(s) for HARQ-ACK information bit(s) in a HARQ-ACK codebook that the UE transmits in a slot not indicated by a value of a PSFCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format 3\_0 or by a value of *sl-PSFCH-ToPUCCH* for a SL configured grant type-1.

The UE reports HARQ-ACK information for PSSCH transmission(s) with corresponding PSFCH reception(s) in slot  only in a HARQ-ACK codebook that the UE includes in a PUCCH or PUSCH transmission in slot , where  is a number of slots indicated by the PSFCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format. If the UE reports HARQ-ACK information for the PSSCH transmission(s) with corresponding PSFCH reception(s) in a slot other than slot , the UE sets a value for each corresponding HARQ-ACK information bit to NACK.

If a UE reports HARQ-ACK information in a PUCCH only for

- PSFCH reception(s) associated with PSSCH transmission(s) scheduled by a DCI format 3\_0 with counter SAI field value of 1, or

- PSFCH reception(s) associated with a PSSCH transmission(s) scheduled by a SL configured grant

within the occasions for candidate PSFCH receptions as determined in Subclause 9.1.2.1, the UE determines a HARQ-ACK codebook only for the PSFCH reception(s) associated with PSSCH transmission(s) scheduled by DCI format 3\_0 or only for the PSFCH reception(s) associated with PSSCH transmission(s) scheduled by a SL configured grant according to corresponding occasion(s), where the value of counter DAI in DCI format 3\_0 is according to Table 9.1.3-1; otherwise, the procedures in Subclause 9.1.2.1 for a HARQ-ACK codebook determination apply.

#### 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel

For a serving cell , a SL BWP, and an active UL BWP, as described in Subclause 12, the UE determines a set of occasions for candidate PSSCH transmission(s) with corresponding PSFCH reception(s) for which the UE can transmit corresponding HARQ-ACK information in a PUCCH in slot . The determination is based:

a) on a set of slot timing values  associated with the SL BWP.  is provided by *sl-FeedbackToUL-ACK* for DCI format 3\_0

b) on the ratio between the sidelink SCS configuration and the uplink SCS configuration  provided by *subcarrierSpacing* in *BWP-Sidelink* and *BWP-Uplink* for the SL BWP and the active UL BWP, respectively

c) a set of configured SL pool bitmaps

d) The value of a period of PSFCH transmission occasion resources for the SL pool provided in *periodPSFCHresource*.

For the set of slot timing values, the UE determines a set of occasions for candidate PSSCH transmission(s) with corresponding PSFCH reception(s) according to the following pseudo-code.

Set  - index of occasion for candidate PSSCH transmission(s) with corresponding PSFCH reception(s)

Set

Set  to the cardinality of set 

Set *k* =0 – index of slot timing values , in descending order of the slot timing values, in set 

Set to the value of the period of PSFCH transmission occasion resources for the SL pool

while 

if

Set – index of a SL slot within an UL slot

while

if slot  starts at a same time as or after a slot for an active UL BWP change on the PCell and slot is before the slot for the active UL BWP change on the PCell

;

else

if slot belongs to the SL pool and contains PSFCH resources as indicated at least by one of the SL pool bitmaps and *periodPSFCHresource*, where  is the *k*-th slot timing value in set 

Set – index of a SL slot within an PSFCH period

while

;

;

end while

end if

;

end if

end while

end if

;

end while

A UE determines  HARQ-ACK information bits, for a total number of  HARQ-ACK information bits, of a HARQ-ACK codebook for transmission in a PUCCH according to the following pseudo-code. In the following pseudo-code, if the UE does not receive a PSFCH, due to the UE not detecting a corresponding DCI format 3\_0, the UE generates a NACK value for the PSFCH. The cardinality of the set defines a total number of occasions for PSFCH reception corresponding to the HARQ-ACK information bits.

 = HARQ-ACK information bit for candidate PSSCH transmission(s) with corresponding PSFCH reception(s) with index for as described in clause 16.5.

If , the UE determines a number of HARQ-ACK information bits  for obtaining a transmission power for a PUCCH, as described in Subclause 7.2.1, as where

- is the number of HARQ-ACK information bits determined for corresponding PSSCH transmission(s) with corresponding PSFCH reception(s) in PSFCH reception occasion .